

CLAIMS

We claim:

1. A process for introducing defects into a metal oxide, said process comprising the steps of:  
applying a gas to a sufficient amount of a metal oxide sample to increase the specific energy;  
heating said metal oxide sample; and  
cooling said metal oxide sample.
2. The process as in claim 1, further comprising the step of:  
maintaining said heating step at a temperature of from about 300 to about 600 °C.
3. The process as in claim 2, wherein said heating step is maintained from about 6 to about 72 hours.
4. The process as in claim 1, wherein said gas is applied to said metal oxide sample at a linear flow rate of at least about 50 cm.
5. The process as in claim 1, wherein said heating step is from about 2 to about 20 °C/min up to about 460 °C.

6. The process as in claim 5, further comprising the step of:  
maintaining said temperature of about 460 °C for 24 hours.
7. The process as in claim 1, wherein said cooling is from about 2 to about 20 °C/min until ambient air temperature is achieved.
8. The process as in claim 1, wherein said gas is a mixture of O<sub>2</sub> and H<sub>2</sub>O<sub>(g)</sub>.
9. The process as in claim 1, wherein said metal oxide sample is V<sub>2</sub>O<sub>5</sub>.
10. The process as in claim 1, wherein said sufficient amount comprises metal oxide comprising a surface area of about 1- 10 square meters.
11. A process for preparing a metal oxide for a battery cathode with increased capacity, said process comprising:  
applying a mixture of O<sub>2</sub> and H<sub>2</sub>O gas to a sufficient amount of a V<sub>2</sub>O<sub>5</sub> metal oxide sample at a linear flow rate of about 50 - 350 cm;  
heating said metal oxide sample at a temperature of from about 300 to about 600 °C for a time period of from about 6 to about 72 hours; and  
cooling said metal oxide sample.

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Inventors: Lyons et al.

## PATENT APPLICATION

12. The product of the process as in claim 11.
13. Vanadium oxide with increased ionic defect concentration.
14. A metal oxide with increased ionic defect concentration.
15. A metal oxide with increased lithium ion capacity.
16. A metal oxide with increased specific capacity.